CLAIMS

1. A magnetic recording medium comprising:

a non-magnetic substrate;

a non-magnetic metal ground layer formed on a main surface side of the non-magnetic substrate and containing Ru at 20 at% or more; and

a magnetic layer formed on the non-magnetic metal ground layer and having a metal magnetic thin film.

2. The medium according to claim 1, wherein the non-magnetic metal ground layer is constructed by layering a plurality of layers which have different compositions from each other.

3. The medium according to claim 1, wherein the non-magnetic metal ground layer has such a graded composition in which a composition of the non-magnetic metal ground layer changes sequentially in a film thickness direction.

4. The medium according to claim 1, wherein the non-magnetic metal ground layer is made of alloy of Ru and at least one kind of material selected from Cr, Ti, Ta, Zr, Hf, Fe, Co, Mn, Si, Al, Ag, Au, and Ir, and a composite ratio of Ru in the alloy is set to 50 at% or more.

5. The medium according to claim 1, wherein the non-magnetic metal ground layer is made of alloy of Ru and at least one kind of material selected from W, Mo, V, Nb, and B, and a composite ratio of Ru in the alloy is set to 20 at% or more.

6. The medium according to claim 1, wherein the non-magnetic metal

ground layer is made of alloy of Ru and at least one kind of material selected from Cu, Ni, Pd, Pt, Y, and C, and a composite ratio of Ru in the alloy is set to 80 at% or more.

7. The medium according to claim 1, wherein the non-magnetic metal ground layer contains oxygen and/or nitrogen.

8. The medium according to claim 7, wherein the oxygen and/or nitrogen is contained at a composite ratio of 0.2 to 10 at% in the non-magnetic metal ground layer.

9. The medium according to claim 1, wherein the non-magnetic metal ground layer is constructed by at least one kind selected from oxide, nitride, carbide, and carbon formed in a granular structure.

10. The medium according to claim 9, wherein the oxide includes at least one kind of material selected from SiO_2, Al_2O_3, TiO_2, Ta_2O_3, ZrO, Y_2O_3, and MgO, the nitride is at least one kind of material selected from TiN, BN, AlN, Si_3N_4, and TaN, and the carbide is at least one kind of material selected from SiC, TiC, B_4C, and TaC.

11. The medium according to claim 1, wherein the magnetic layer is constructed by layering a plurality of metal magnetic thin films, with at least one intermediate layer inserted therebetween, the intermediate layer being made of at least one kind of material selected from Pt, Pd, and Ni.

12. The medium according to claim 1, wherein the magnetic layer contains

at least one kind of material selected from Cr, Mo, W, V, Nb, Zr, Hf, Ta, Ru, Rh, Ir, Ti, B, P, and C at 0.5 to 25 at%.

13. The medium according to claim 1, wherein the magnetic layer contains oxygen and/or nitrogen at 0.2 to 15 at%.

14. The medium according to claim 1, wherein the magnetic layer is constructed by at least one kind selected from oxide, nitride, and carbide, formed in a granular structure.

15. The medium according to claim 1, wherein the magnetic layer is constructed by layering a plurality of metal magnetic thin films, with at least one separation layer inserted therebetween, the separation layer being made of Ru singly or alloy of Ru and at least one kind of material selected from Al, Ti, V, Cr, Fe, Mn, Co, Ni, Cu, Y, Zr, Nb, Mo, Rh, Pd, Ag, Hf, Ta, W, Ir, Pt, Au, Si, B, and C.

16. The medium according to claim 15, wherein the separation layer is layered as a layer made of at least one kind of material selected from a first group of Cr, Mo, W, Ti, Ta, Nb, Ni, Cu, Al, V, Zr, Hf, C, B, and Si, and a second group of oxide, nitride, and carbide, the oxide including SiO_2, Al_2O_3, TiO_2, Ta_2O_3, ZrO, Y_2O_3, and MgO, the nitride including TiN, BN, AlN, Si_3N_4, and TaN, and the carbide including SiC, TiC, B_4C, and TaC, the separation layer is mixed with at least one kind of material selected from the second group, or the separation layer is mixed with at least one kind of material selected from the first and second groups.

17. A method of manufacturing a magnetic recording medium, comprising:

a step of forming a non-magnetic metal ground layer containing Ru at 20 at% or more, on one main surface side of the non-magnetic substrate, under a condition of 100°C or less; and

a step of forming thereafter a magnetic layer having a metal magnetic thin film, on the non-magnetic metal ground layer, under a condition of 100°C or less.

18. The method according to claim 17, wherein the non-magnetic metal ground layer and the magnetic layer are formed by a sputtering method.